About Los Alamos

As the senior laboratory in the DOE system, the Laboratory executes work in all of DOE's missions: national security, science, energy, and environmental management. Our contributions are part of what makes DOE a science, technology, and engineering powerhouse for the nation.

About Chemistry Division

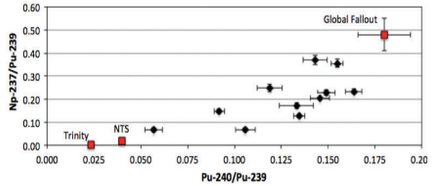
With five groups and a staff of nearly 300, the Chemistry Division serves the Laboratory's missions with innovative chemical science and technology for energy research, threat identification and mitigation, weapons science, health, space research, and much more.

Our capabilities are also essential for energy security, civilian-sector R&D, and industrial partnering.

We have expertise in

- Actinide chemistry
- Isotope science
- Synthetic and mechanistic chemistry
- Chemistry for measurement and detection science
- Chemistry of materials
- Data analysis and modeling for chemical sciences
- Radiochemistry and nuclear science

Over the years, many of our postdoctoral fellows have joined the Laboratory as technical staff members. Others have gone on to academic, research, national laboratory, or industrial appointments.



In work published in the Journal of Radioanalytical and Nuclear Chemistry, researchers describe using lichens collected in New Mexico to detect residual airborne radionuclides from the atmospheric nuclear testing that happened as long as 50 years ago.

Researcher Marian Jandal received a prestigious DOE Early Career Award to study basic neutron reaction science. His grant is now in its third year.

Opportunities

Chemistry Division offers opportunities across the employment spectrum, from student positions, to graduate and postdoctoral fellowships, to mid-career research positions. We also have active programs in industrial partnering.

Learn more about Chemistry Division:
http://www.lanl.gov/org/padste/adcles/chemistry/

Nuclear and Radiochemistry office: (505) 667-4546
Chemistry Division Office: (505) 667-4457

Cover: Nuclear debris from historic U.S. nuclear tests is analyzed for trace actinide isotopic composition and persistent signatures of nuclear fission to develop new forensic science techniques. Shown is a digital autoradiograph of a debris sample.

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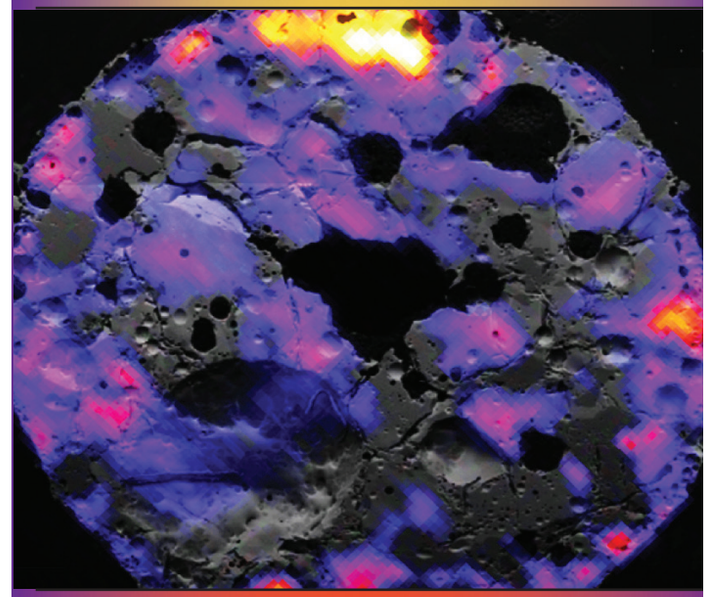
CHEMISTRY

Nuclear and Radiochemistry (C-NR)



C-NR provides vital radiochemical and radioanalytical capabilities to a wide range of programs

Los Alamos
NATIONAL LABORATORY

About C-NR

C-NR programs include maintenance and stewardship of the nuclear stockpile, nuclear non-proliferation, environmental management, international safeguards, repository validation, and civilian nuclear energy programs. C-NR performs research and addresses immediate mission needs for sponsors in nuclear weapons, global security, and for those requiring the use of radioanalytical and radiochemical handling capabilities at a range of (radio) activity levels. Current major sponsors include the National Nuclear Security Administration, other federal agencies (Department of Defense, Department of Homeland Security, etc.), and LANL institutional support. Basic and applied research is conducted in support of radiochemistry and radioanalytical methods, nuclear chemistry and physics, and inorganic chemistry.

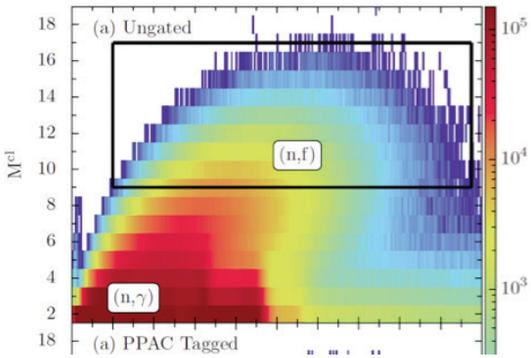
Capabilities

Radiochemical Separations

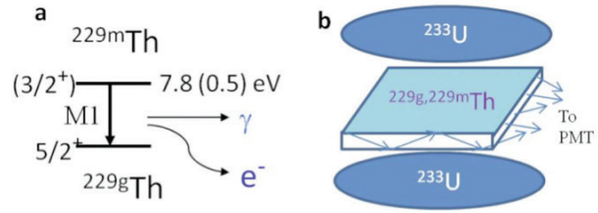
Advanced methods in separations science are used to prepare pure samples for radiometric analysis. These techniques are used for radiochemical diagnostics of fission experiments conducted at the National Criticality Experiments Research Center in Nevada and other facilities.

Nuclear Weapons Performance

C-NR validates the performance of LANL-designed nuclear weapons as measured by radiochemical



Measuring the neutron capture cross-section of 239Pu helps support of the the Advanced Reactor Concept program, a DOE program considering the next generation of reactor designs.



Nuclear Clock: a team observed the de-excitation the 229mThorium nuclear isomer. This sought-after discovery lays the ground work for the development of a "nuclear" clock, as well as other exciting possibilities in nuclear, atomic, condensed matter and optical physics, quantum information, metrology and cosmology.

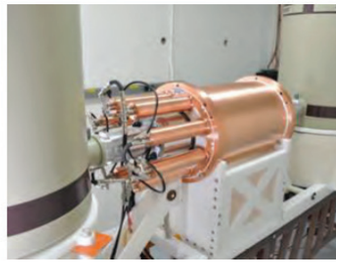
detectors. The group also contributes to future nuclear test readiness.

Radioanalytical Measurements

The radioanalytical capability utilizes radiochemistry, mass spectrometry, and counting technologies to perform routine environmental monitoring in support of treaty verification and other threat reduction and global security missions.

Nuclear Chemistry

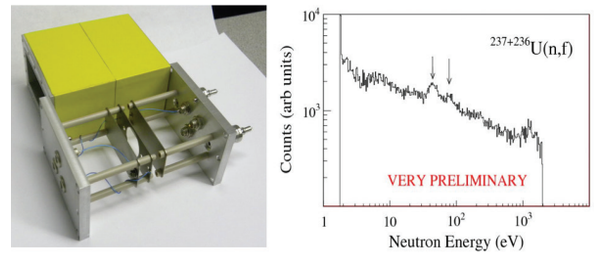
Advanced studies of nuclear fission, neutron capture, nuclear isomers, along with the development of radiochemical diagnostics for inertial confined fusion are underway. Radiochemistry is used to isolate reaction products of interest or to make radioactive targets. We are also developing new technologies for the ultra-sensitive detection of actinides and other isotopes of interest for threat reduction and stockpile stewardship.



Radionuclides in the Environment

C-NR has methodologies and facilities for measurement of very low concentrations of radionuclides in environmental samples.

The high purity Ge Clover Detector is a high effiency, low background detector system with active background suppression and event-by-event data capture. It is part of a 7000 ft2 facility located at TA-48 that houses almost 200 gamma, alpha, and beta counters.



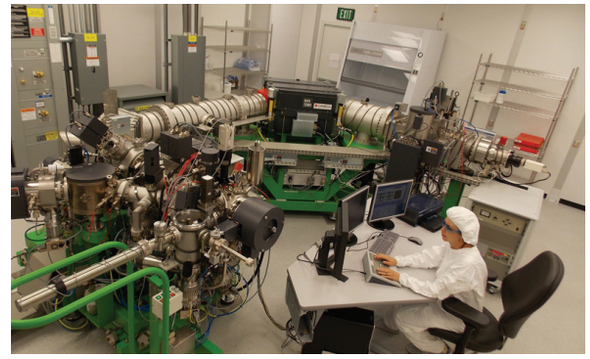
Constructed gas flow ionization chamber to measure the neutron-induced fission cross section for the short lived isotope 237U at the Lead Slowing-Down Spectrometer (LSDS) at LANSCE.

Mass Separations and Mass Spectrometry

C-NR maintains some of the most advanced equipment, methodologies, and facilities for mass separations and mass spectrometry available today. We can measure very low concentrations of radionuclides and have some of the most advanced facilities world-wide for environmental level isotope ratio measurements.

In Vitro Bioassay Measurements

The Bioassay Program Team in C-NR supports the Laboratory mission by providing plutonium, americium, uranium, and tritium bioassay monitoring for radiation workers. C-NR maintains DOELAP Accreditation for participation in the program.



The CAMECA IMS 1280 LG-SIMS allows analysis of both radiological and non-radiological samples.